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ABSTRACT

This study examined whether post-reading comprehension would be affected by the inclusion of pictorial material with a story and a prereading prediction questionnaire. Subjects, 75 heterogeneously grouped fourth grade students randomly assigned to one of three groups, either (1) read a basal reader passage with pictorial material; or (2) read the same passage with the pictorial material deleted; or (3) answered an 11-item prereading prediction questionnaire prior to reading the basal reading passage which included the pictorial material. All subjects then completed a 10-item posttest. Results indicated that there was no statistically significant difference between the posttest results of the subjects in the three groups. (Three tables of data are included; 30 references, survey instruments, reading passages, and an appendix of score data are attached.) (RS)

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PREREADING PREDICTION AND SURVEY ACTIVITIES AND THEIR EFFECT ON READING COMPREHENSION

by

MARY ANGELINO

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ABSTRACT

This study was conducted to determine whether post-reading comprehension would be affected by the inclusion of pictorial material with a story and a prereading prediction questionnaire. The seventy-five subjects used for this study were heterogeneously grouped fourth grade students. Twenty-five subjects were randomly assigned to each of the following three samples: (A) Answer an eleven item pre-reading prediction questionnaire prior to reading the basal reader passage which included pictorial material; (B) Read the basal reader passage which included pictorial material; (C) Read the same passage which deleted pictorial material. All subjects then completed a ten item post test.

Results indicated that there was no statistically significant difference between the post test results of the three samples.

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PREFACE

Often remedial students simply jump into reading without getting any orientation. They become awash in waves without knowing what sea they are swimming in! (Lerner, List and Richek, 1989).

Current instruction in reading comprehension could be improved by making some adjustments in the focus of lessons. This redirection focuses efforts on the development and teaching of strategic reading comprehension behaviors. (Johnston, 1985).

Literacy, as reading teachers know, involves more than basic decoding skills. It requires that readers comprehend printed language and use it to infer, generalize, predict and evaluate. What teachers do in the classroom before students begin to read a selection or assignment affects students' eventual comprehension of the printed text. Many teachers give reading assignments as preparation for discussion rather than reversing the order to maximize learning. (Devine, 1986).

Reading comprehension is improved with prereading background supplements and postreading question periods. Encouraging students to formulate predictions based on questions is a technique which is suspected to improve the ability to comprehend, a skill that can be used in other circumstances. In effect, the students will be taught not only what material they have read, but how to read. (Johnson, 1987).

As students advance in grades, they need skills to be capable of reading expository text. Prereading activities are a way to help students have a study strategy for their repetoire. Reading with greater purpose, especially if in-

terest has been ignited, may be very advantageous in reading comprehension.

It would therefore be beneficial for teachers to know if time spent in prereading activities does indeed have a positive effect on reading comprehension. Students are very often provided with valuable information through story titles, headings, illustrations and other story elements. These can serve as a springboard for predictions. Through this preview period, a student's curiosity should be aroused and this can become the motivating force for purposes to reading. Also, the inclusion of pictorial material may add to the activation of the reader's schema.

HYPOTHESIS

It is hypothesized that fourth grade students who make prereading predictions and survey illustrations and headings will not demonstrate greater postreading comprehension than those who do not use those strategies.

DEFINITION OF TERMS

Activities immediately preceding the reading of a particular passage are prereading. (Hawes, Schell, 1987). Previewing, also known as surveying, means looking quickly through a printed piece prior to reading to predict the general topic. (Santersanio, 1983). Survey refers to a previewing strategy prior to reading in order to formulate purpose for reading and understand author's organizational pattern. (Devine, 1986).

ASSUMPTIONS, LIMITATIONS AND DELIMITATIONS

It is assumed that the story chosen for this study, from a fourth grade reading basal, is on a level that these fourth grade students will be able to read.

The three groups chosen for this study are each heterogeneously grouped in that they represent a range of academic ability. The seventy-five subjects, girls and boys, are from three fourth grade classes in Connecticut Farms Elementary School. This is a Pre-Kindergarten to Grade Five school in Union, New Jersey. The students are from middle income families, generally speaking. The sexes of the students are not factors.

This study will only reflect a small sampling of suburban elementary school children in a neighborhood of people of diverse ethnic, social, and economic backgrounds. The conclusions of this research cannot be extended beyond the sample population.

PROCEDURES

Seventy-five copies of a story were duplicated, twenty-five of which contained a prereading prediction questionnaire and pictorial material accompanying the story, twenty-five of which contained pictorial material accompanying the story, and twenty-five of which contained only the story typed on plain paper without any visual cues. These were then shuffled repeatedly to produce random order. They were then randomly distributed to seventy-five students. Experimental sample A,

experimental sample B, and experimental sample C (corresponding to the kind of material received), each received the same postreading comprehension test in multiple choice format. (See Appendix). The students completed this entire activity during one class period.

A comparison of the mean scores of comprehension questions answered correctly for all three samples was made using students t.

RESULTS

To analyze the results, mean scores of the three experimental samples A, B, and C were compiled, and compared utilizing students' t tests. The purpose was to determine if there was any significant difference among the three groups as a result of the treatment.

Table I illustrates the findings in respect to the ex-

Table I

Experimental Sample A vs. Experimental Sample B

Experimental Sample	Mean	SD	t
A	58.40	23.92	.773
B	63.20	19.93	

DF 48

perimental sample A (where twenty-five students received the story with a prereading questionnaire, pictorial material accompanying the story, and a postreading comprehension test)

and experimental sample B (where twenty-five students received the story with pictorial material accompanying it and a postreading comprehension test). As indicated by the table, a t of .773 was computed denoting that there was no statistically significant effect as a result of the prereading questionnaire.

In examining the means, as seen in Table I, a disparity of 4.80 points can be seen to exist between experimental sample A and experimental sample B. Those students who received the prereading questionnaire scored lower than those who did not receive it.

Table II illustrates the findings in respect to the experimental sample B and experimental sample C (where twenty-five students received the story which had pictorial material deleted).

Table II

Experimental Sample B vs. Experimental Sample C

Experimental Sample	Mean	SD	t
B	63.20	19.73	.269
C	64.58	22.65	
	DF 48		

As indicated by the table, a t of .269 was computed denoting that there was no statistically significant effect as a result of the pictorial material deleted from the story. In examin-

ing the means, as seen in Table II, a disparity of 1.38 points exists between the mean scores achieved by experimental sample B and experimental sample C. Those students who received the story which had pictorial material deleted scored higher than those who had pictorial material included.

Table III illustrates findings in respect to the experimental sample A and experimental sample C.

Table III

Experimental Sample A vs. Experimental Sample C

Experimental Sample	Mean	SD	t
A	58.40	23.92	.98
C	64.58	22.65	
	DF 48		

As indicated by the table a t of .98 was computed denoting that there was no statistically significant effect as a result of the prereading questionnaire and pictorial material accompanying the story.

In examining the means, as seen in Table III, a disparity of 6.18 points can be seen to exist between experimental sample A and experimental sample C. Those students who received the story without a questionnaire and without pictorial material scored highest. Table III showed the greatest difference in mean scores.

CONCLUSIONS AND IMPLICATIONS

In the analysis of the Students t test, the findings indicate that there is no significant difference as a result of the variables among the three experimental samples.

It is interesting to note that the highest mean score was reached with experimental sample C. As an observer during the classroom experiment, it was noticed that this group referred back to the context of the story while answering the post test. Since there were no pictorial aids to serve as cues, it was inferred that the students could not rely on them as memory enhancers and had to reread for clarification.

Another observation made was that experimental sample B completed the activity in the shortest amount of time. Since this sample included pictorial material accompanying the story, a possible explanation would be that the visual aids directed students' attention during the post test. Further research may be conducted to ascertain whether a visual cue serves as a sign post for students in the comprehension check stage.

Filling out the prereading questionnaire was an arduous task for the students in experimental sample A according to the amount of time it entailed and the informal verbal feedback received by the experimenter. The questionnaire deliberately focused attention on the pictorial material in the prediction stage, however, their mean score was the lowest.

The post test scores had a similar range distribution for all three samples. It is implied that the various ability levels among a random group of students reveals a range of results.

The null hypothesis that there would be no significant difference in comprehension between the samples was accepted since there were no statistically significant difference found.

Based on mean differences between the samples only, it would appear that the best approach would be to eliminate prereading questionnaires and pictorial materials from reading materials. However, since there was no statistically significant evidence to support the inclusion or exclusion of pictorial material with a story, further research should be done to provide more conclusive results.

PREREADING PREDICTION AND SURVEY ACTIVITIES AND THEIR EFFECT ON READING COMPREHENSION:

RELATED RESEARCH

Prereading strategies have been known to provide a framework for reading purposes. Research has been done which supports the positive effect on comprehension as a result of previewing techniques. Since titles, headings and illustrations are very often attention getting elements in previewing a story, they too have been researched to ascertain their effect on comprehension.

Illustrations in instructional texts can have a variety of effects. For example, they may add to reader interest and enjoyment. They may affect attitudes and arouse emotional responses. They may be particularly efficient in providing spatial information that is difficult to express in words. On the other hand, they may have a detrimental effect when teaching young children to read. (Levie and Lentz, 1982).

The following review will first discuss prereading activities and their positive or negative effects, then discuss studies done which indicate that the inclusion of illustrations in a story does or does not have an effect on post-reading comprehension.

In recent years, researchers in education have been interested in strategies which challenge students to involve critical thinking skills and develop greater comprehension. A popular strategy is the SQ 3R (Survey, Question, Read, Recite and Review) method by Robinson,

(1961). Another popular strategy is the DRTA (Directed Reading Thinking Activity by Stauffer (1969). After an initial survey of the title and accompanying pictures or diagrams, the readers are encouraged to develop purposes for reading. Students are guided through the process of sampling text, making predictions based on prior knowledge and textual information, resampling text, and confirming or adjusting predictions in light of new information. (Devine 1986).

McGinley and Denner (1987) in "Story Impressions: A Prereading/Writing Activity" found that story impressions operate in a similar manner to the DRTA because it gets readers to predict the events of the story to be read by providing fragments of the content. The process of developing the story guess itself, was the major factor in facilitating comprehension.

Researchers Hawes and Schell (1987) in "Teacher-Set Pre-Reading Purposes and Comprehension" examined the teacher's guides of five basal reader series and reached the following conclusion: Teacher-set Pre-reading purposes in a basal reader Directed Reading Activity have a definite value and should not be treated lightly nor implemented casually by teachers as they do seem to facilitate comprehension. Hawes and Schell used three stories for third graders from their basal readers. These stories deliberately did not include their illustrations.

One story had a written purpose, one had an oral purpose and one had no purpose given. It was concluded that purposes for reading need to be definitely stated and taken seriously through follow up questions. Their criticism is that teacher set purposes have value in pre-reading but may not promote the independence which mature readers need.

Johnson in 1987 wrote "Improving Reading Comprehension Through Pre-reading and Post-reading Exercises" and referred to several research studies in which it was established that reading comprehension improves when teachers precede the lesson with background information and follow the lesson with discussion. Johnson concluded that the most effective approach to the development of a pre-reading mindset and a post-reading analysis to use mental associations, visual images for the background, questions throughout the passage, and student-designed questions for the discussion. The intent is that these practices may improve the students' ability to comprehend other reading texts, not just the specific assignment.

Researchers have begun to examine ways to encourage children with learning disabilities to use active learning strategies in "Improving Reading Comprehension by Using Paragraph Restatements" by Jenkins, Heloitis, Stein and Haynes (1987). Thirty two elementary learning disabled students were randomly assigned either to a condition in

which they were trained to use a comprehension monitoring strategy or to a control condition. Strategy students were instructed to write brief restatements as they read. It was determined in all instances that the strategy trained students exhibited better comprehension than the control students.

One approach that offers promise in enhancing comprehension question performance is instruction in question generation. By generating and answering self questions concerning the key points of a selection, inadequate or incomplete comprehension can be identified and resolved by the reader. Davey and McBride (1986) in "Effects of Question Generation Training on Reading Comprehension" instructed sixth graders to generate good think type questions. The group trained in question generation outperformed two control groups on literal post passage items. A major contribution of this study was that a rather brief generalizable intervention could make such a difference. Young students could be trained in text-based inferencing with intact expository texts and that such training improves passage comprehension.

Since a desirable aim of instruction is to encourage independence in the learner, Frase and Schwartz, (1975), explored "The Effect of Question Production and Answering on Prose Recall". Their experiments reflected student generated questions and instructor imposed questions. In both studies, questioning activities produced higher

overall recall than just studying. The student questioning activities resulted in improved recall for information that is directly related to those questions.

Prequestioning is considered to be a strategy for teaching and improving reading comprehension. To assess this further, Wiesendanger and Wallenberg (1978) conducted a study to determine whether a group of 90 urban third graders in an oral prequestioning strategy would differ significantly in silent reading comprehension from a control group which did not participate in the oral prequestioning.

Findings revealed that the control subjects who received no prequestions achieved the highest scores. As a result of these findings, it is speculated that prequestions may cause the student to focus his/her attention on obtaining answers to particular questions, thus lowering the overall reading comprehension.

According to Peeck (1970) in "Effect of Prequestions on Delayed Retention of Prose Material" experiments with prequestions indicate their usefulness when retention of certain specific information is aimed at. Peeck worked with 72 University undergraduate students and found that prequestion groups showed better long term retention of question relevant content. This group also performed better on immediate retention as compared to the "No-Guess" group. These conclusions are limited to questions

of a factual nature. When a more evenly balanced distribution of knowledge is to be accomplished, the use of prequestions does not seem advisable. Since subjects in the postquestion conditions do not know which information may turn out to be relevant, they seem to slow down in order to be best prepared although subjects in the prequestioning conditions spent much of their reading time in looking for the question relevant prose content.

Illustrations are hypothesized to provide several important "bridges" between prereading and reading. The relative contribution of illustrations to reading performance has been a controversial topic among educators and authors of children's reading materials. In fact, the research is divided on this issue.

Comenius in his Orbis Pictus (circa, 1650) is credited as being the first to use pictures in children's books. Crude beginnings were also evident in The New England Primer (1792). In some linguistic series, use of pictures is played down and actually omitted. In addition, the Spalding Method strongly advocates reading material minus illustrations. (Concannon, 1975).

Authors Levie and Lentz (1982) in "Effects of Text Illustrations: A Review of Research" reviewed 155 experimental comparisons of learning from illustrated text versus text alone which involved over 7,000 human subjects. From this research and their own "reasonable

intuition", Levie and Lentz characterized the following statements as guidelines:

1. In normal instructional situations, the addition of pictorial embellishments will not enhance the learning of information in the text.

2. When illustrations provide text redundant information, learning information in the text that is also shown in pictures will be facilitated.

3. The presence of text-redundant illustrations will neither help nor hinder the learning of information in the text that is not illustrated.

4. Illustrations can help learners understand what they read, can help learners remember what they read, and can perform a variety of other instructional functions.

5. Illustrations can sometimes be used as effective/efficient substitutes for words or as providers of extralinguistic information.

6. Learners may fail to make effective use of complex illustrations unless they are prompted to do so.

7. Illustrations usually enhance learner enjoyment and they can be used to evoke affective reactions.

8. Illustrations may be somewhat more helpful to poor readers than to good readers.

9. Learner-generated imaginal adjuncts are generally less helpful than provided illustrations.

Peeck, (1974) in "Retention of Pictorial and Verbal Content of a Text With Illustrations" conducted a study with 71 fourth graders to investigate the effect of illustrations on learning from reading. The results of this study indicates that the group who read the text with illustrations produced higher scores in retention testing than the group who read the text without illustrations.

In "Picture Enrichment of Delayed Recall: Support

From a Unique Source", Marilyn J. Haring (1982) conducted a study with fourth and sixth grade students to see if pictures had an effect on consistency of recall. Half of the children received pictures with the story. Pupils receiving pictures with text recalled details more consistently than pupils reading text without pictures. The understanding is that pictures supply a potential memorial strategy to facilitate recall. It was also found that the sixth graders performed better than the fourth graders.

Developmental age is not only a factor with performance, but also ability is a factor. Research with first graders was investigated by Georgia Green and Margaret Olsen in "Beginning Reading", (1985). The research reported indicates that first graders who read poorly can answer comprehension questions better when the texts they read are illustrated, while good readers answer more questions correctly on texts that do not depend on crucial illustrations. This suggests that good readers have learned to ignore the illustrations, while poor readers, either as a cause or an effect of their limited ability, depend on illustrations to interpret the text they read. This implies that the use of illustrations used in material for teaching reading should be re-evaluated in light of the risk it poses of encouraging a crippling strategy of illustration-dependence.

Miller (1938) in "Reading With and Without Pictures" organized an investigation to determine if children who read a basal set of primary readers would secure greater comprehension than those who do not have accompanying pictures. About 100 children in each half of the first three grades were used for this study. The data secured in this study showed that the children who read without pictures understood what they read as well as did the children who read the same material with the use of pictures. This was an interesting conclusion since Miller had conducted a survey on teacher opinion of the value of illustrations in primary readers and one hundred teachers felt illustrations were crucial. The teachers explained that pictures were necessary to introduce characters in the story, to arouse and sustain interest, to clarify unfamiliar concepts appearing in print, and to furnish clues to word recognition. These teachers also felt that well-illustrated books are more attractive and interesting to children.

According to Terry Rose (1986) in "Effects of Illustrations on Reading Comprehension of Learning Disabled Students", even though comprehension has been cited as a major benefit of illustrations, insufficient evidence is available. Rose conducted a study among 32 learning disabled elementary-aged students. Students read an illustrated passage and a non-illustrated passage and answered eight comprehension questions following each passage. Results showed sig-

nificantly more correct responses to comprehension questions following the non-illustrated passage. A possible explanation for this is that illustrations distract the reader's attention from the print and also that learning disabled students are unable to filter out extraneous stimuli. Rose concludes that teachers need to focus the reader's attention on the printed stimulus rather than adjunct stimuli (illustrations) for learning disabled students.

In a recent series of studies, Zimmer found that imposing external focusing strategies on already competent information processors can deter a reader's "natural" reading activities. In "Text Structure and Retention of Prose", Zimmer explored the effects of text structure using two kinds of reading materials: a standard text with headings and illustrations, as well as a nonstructured manuscript. The manuscript readers scored higher on delayed tests, generated more relevant ideas, and wrote better essays both immediately and after a delay.

In "Contribution of Pictures to Children's Comprehension of the Main Idea in Reading", children from grades three and six were chosen by Koenke, (1968) as subjects in a study to examine the extent to which content relevant pictures contribute to children's comprehension of the main idea inherent in a printed passage. The three modes of presentation were (a) passage accompanied

by a picture specifically relevant to the main idea; (b) passage accompanied by a picture generally relevant to the main idea; and (c) passage without an accompanying picture. Koenke had pictures drawn to illustrate the main ideas of short, expository paragraphs and then attempted to measure the effect of the pictures upon children's main idea statements. His conclusion was that pictures did not enhance main idea comprehension.

In order to test the hypothesis that when pictures and words are presented together, the pictures would function as distracting stimuli and interfere with the acquisition of reading responses, Samuels (1967) conducted two experiments. In experiment I, pre-first graders learned to read four words with no picture, a simple picture or a complex picture present. During acquisition trials when pictures were present, the simple and complex picture groups made more correct responses. During test trials, with no pictures present, the no-picture group excelled. In experiment II first graders were given classroom reading instruction under a no-picture or picture condition. In the article "Attentional Process in Reading: The Effect of Pictures on the Acquisition of Reading Responses" Samuel's results disclosed that poor readers with no picture present learned more words. Among better readers, the difference was not significant.

These aforementioned studies have given examples of arguments against the effect of illustrations on comprehension. The Gestalt school of psychology emphasizes the value of an initial impression of wholeness before an analytical attack is made on the parts which derive their meaning from the whole. Howard McClusky (1934) in "An Experiment on the Influence of Preliminary Skimming on Reading" applies the Gestalt idea to reading and suggests that a normal reading of a passage of subject matter should be preceded by a skimming overview of the material. The experimenter asked questions of the subjects, who were sophomores at the University of Michigan, after skimming first and then reading normally. The evidence indicated that, on the average, a preliminary skimming enhanced the rate of normal reading without appreciably diminishing the comprehension. In a few cases, preliminary skimming actually interfered with normal reading. For a majority of subjects the rate of reading is facilitated when the material is such that a preliminary skimming will give a fair estimate of the content.

Graves, (1983), found that giving students previews frees them at least somewhat from attending to the details of what they are reading and enables them to devote more attention to dealing with higher-level matters such as making inferences.

According to Jean Bauso (1988) in "The Need For Pre-reading Instruction" any type of prior preparation enables students to have a more successful reading experience by building or activating knowledge they bring to the text, by arousing expectations, by creating a purpose to read beyond just the teacher's saying so, by directing them in what to concentrate on - in general, by making them more actively involved in the reading.

In conclusion, there seems to be evidence for and against the positive effect previewing a story, specifically, making predictions based on illustrations, has on the post reading comprehension of students. An assumption appears to pervade the literature that a positive effect on comprehension will result from pre-reading predictions although experimental evidence has been found to the contrary.

Since illustration in books are a source of interest and pleasure to students, it should be remembered that no attempt was made to measure the influence of pictures on such matters as interest, enjoyment or appreciation in the artistic sense. Miller (1938).

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APPENDICES

PREREADING QUESTIONNAIRE

By Mary Angelino

NAME_____

1.) Write the title of the story.

_____

2.) Describe a treasure.

_____

3.) Why would a treasure be beneath the sea?

_____

_____

4.) What sort of treasure do you think will be beneath the sea?

_____

_____

5.) Refer to the footnote on p. 471 for the pronunciation and definition of Slot ter Hooge. Write them here.

_____

_____

6.) When do you think ships like the one pictured on p. 471 were used?

_____

_____

7.) Skim the first paragraph for the setting. What year and what place does this story refer to?

_____

_____

8.) Describe the similarities and differences that you see in the illustrations on p. 472 and p. 475.

_____

_____

_____

Used for Experimental Sample A

9.) According to the map on p. 474, where does the route of the ship begin and end?

_____

_____

10.) Read the labels on the time line on p. 476. Who are the characters mentioned and what did they do?

_____

_____

_____

_____

11.) Based on your own prediction of what you think this story will be about, write a question that you would like to find answered in the story.

_____

_____

_____

_____

Prereading Questions Written by MARY ANGELINO
Based on Story: TREASURE BENEATH THE SEA by Dan D'Amelio
Scott, Foresman and Company, 1978.

Treasure Beneath the Sea

by Dan D'Amelio

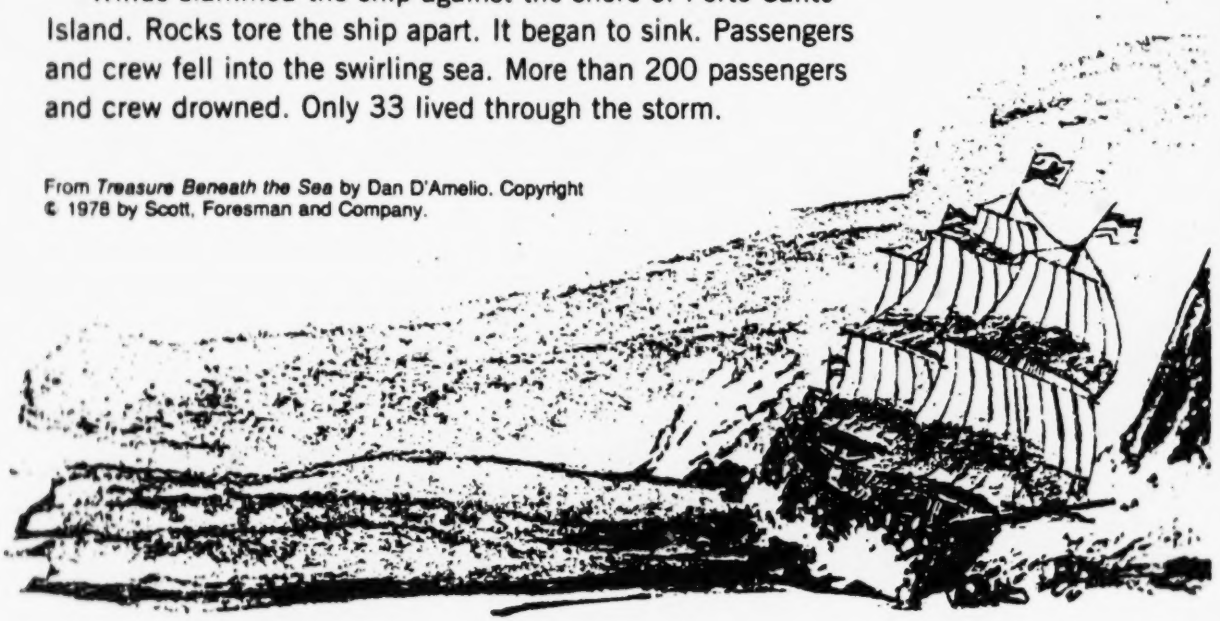
The Dutch ship *Slot ter Hooge*[1] sailed through the English Channel. It was a fall day in 1724. The sky was clear and the water was calm. Many of the passengers and crew lined the ship's deck. They were enjoying the fine weather. But it was not to last.

When the ship reached the North Atlantic Ocean, the weather changed. The sky turned dark and the wind picked up. Soon strong winds and high waves were battering the *Slot ter Hooge*.

The crew fought to keep the ship on course. But the winds were too strong. The waves were too powerful. The ship was pushed in the direction of the Madeira Islands.

Winds slammed the ship against the shore of Porto Santo Island. Rocks tore the ship apart. It began to sink. Passengers and crew fell into the swirling sea. More than 200 passengers and crew drowned. Only 33 lived through the storm.

From *Treasure Beneath the Sea* by Dan D'Amelio. Copyright © 1978 by Scott, Foresman and Company.

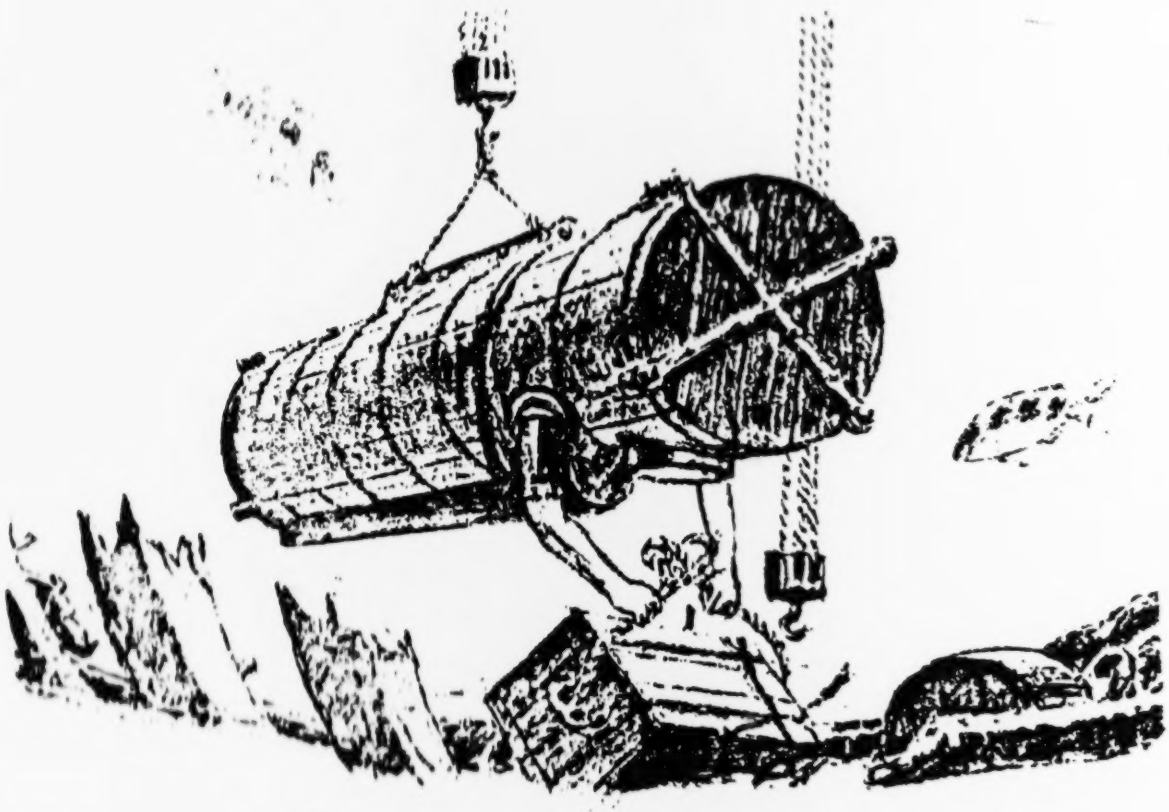


1. *Slot ter Hooge* (slôt ter hō′kə) means "castle of Hooge."

Used for Experimental Samples A and B

A year later, in 1725, the Dutch East India Company drew up a contract with John Lethbridge, an Englishman. The company owned the *Slot ter Hooge*. And Lethbridge's job was to recover the ship's treasure for the company. Four chests of coins and 1,500 bars of silver had gone down with the ship.

The Dutch East India Company had picked John Lethbridge for a good reason. He had invented a "diving machine." It was simply a wooden barrel with two holes for a diver's arms and a small window. A diver stayed underwater until the air in the barrel was used up. Then the diver was raised up and fresh air was pumped into the barrel. With his diving barrel, Lethbridge could stay underwater for a few minutes. Lethbridge used the barrel to recover treasure from the *Slot ter Hooge*.



472

Many years later, two important questions were asked by Robert Sténuit. How much of the ship's treasure did Lethbridge recover? And where exactly did the ship go down?

Sténuit was a treasure diver. He was interested in the sunken treasure. He had studied old reports on the *Slot ter Hooge*. But he had been unable to find the answers to his questions.

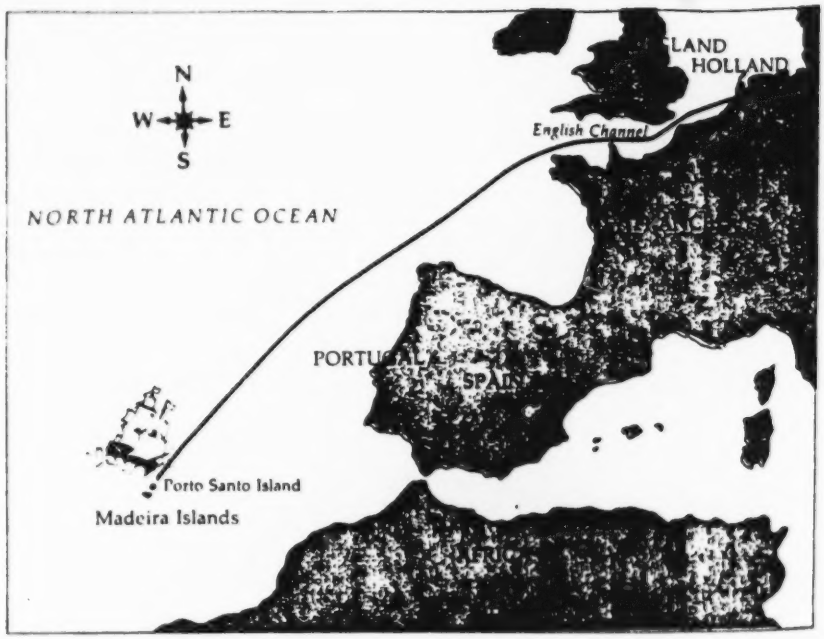
One day in 1974, Sténuit visited some friends in London, England. They showed him a written description of an old mug. On one side of the mug was a coat of arms with the initials of John Lethbridge. On the other side was a drawing of Lethbridge's diving barrel. And next to the drawing was a map of Porto Santo Island. The map showed a ship on a north bay of the island. One of Sténuit's questions was answered.

Sténuit knew exactly where the *Slot ter Hooge* had gone down. But there was still one question unanswered. How much of the ship's treasure remained at the bottom of the North Atlantic Ocean?

Sténuit went to The Hague in Holland and checked the national records. He had been to The Hague before. But he had not been able to learn how much treasure Lethbridge had recovered from the *Slot ter Hooge*. Some of the records were missing.

On this visit Sténuit was lucky. He found the missing records. He learned that Lethbridge had made five trips to Porto Santo. His first trip was in 1726. Lethbridge had recovered 349 bars of silver and hundreds of coins. He recovered more silver bars and coins on his other trips. They took place in 1727, 1732, 1733, and 1734.

Sténuit figured how much treasure was left to find. He added up all the treasure that John Lethbridge had recovered. And he figured that more than 100 bars of silver were still lying beneath the waters of Porto Santo.

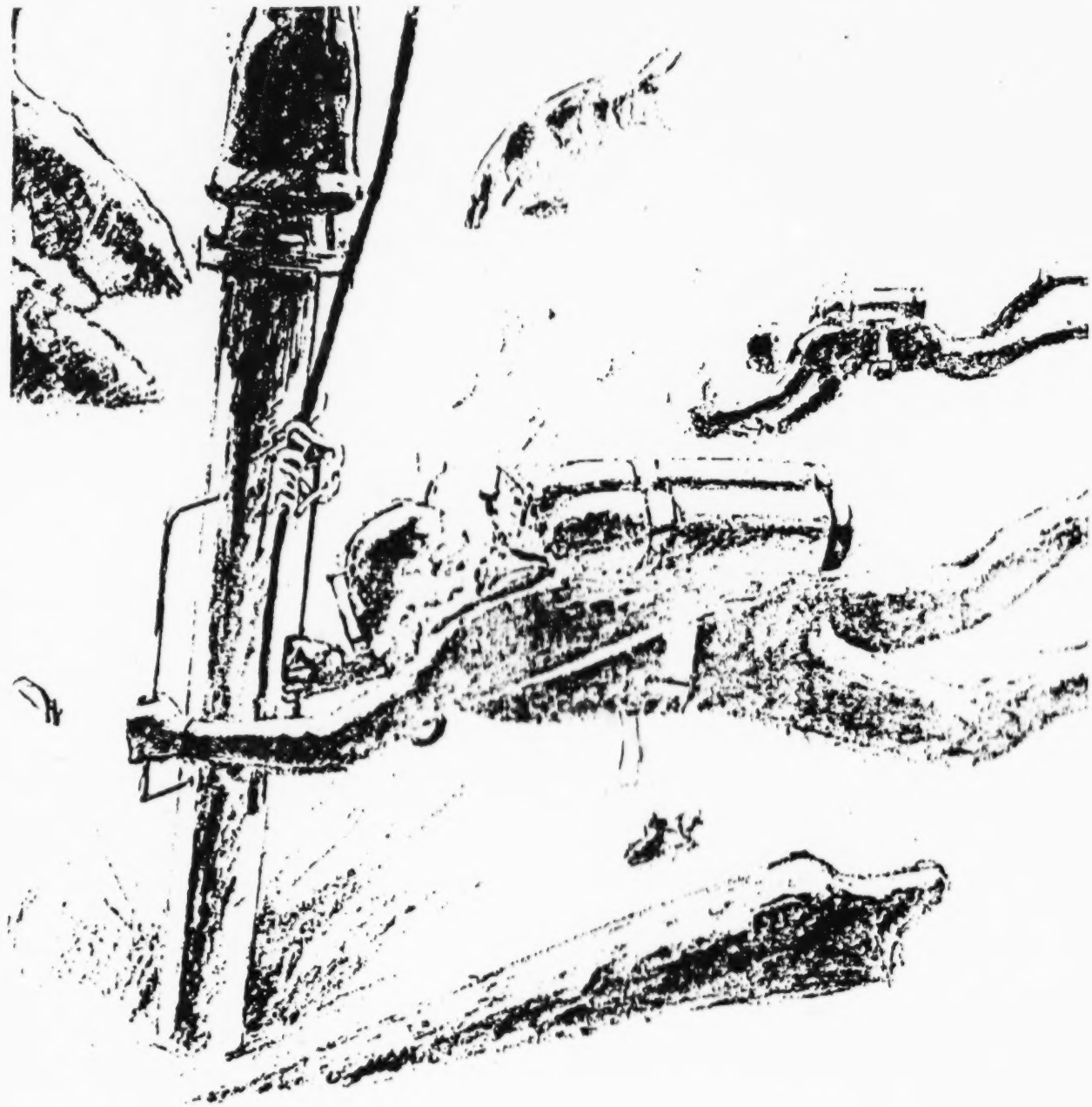


Route of the *Slot ter Hooge*

Sténuit went right to work. He wasted no time putting together a diving team. With four other divers, Sténuit arrived at Porto Santo in May, 1974. They dropped anchor in 60 feet of clear water. Sténuit went over the side. To his great surprise, he saw that his boat's anchor had dropped on the large anchor of the *Slot ter Hooge*. To Sténuit, it seemed a lucky sign.

Toward the end of the day, they found their first piece of treasure. It was a small silver coin from the *Slot ter Hooge*. That night the island was hit by a storm. For the next five days, the water was too rough for diving. Sténuit and his team could not work.

When the weather cleared, the divers were able to continue with their search for the treasure. One day they discovered about 100 silver coins at the bottom of the sea. The coins were lying on a large, flat rock. Besides coins, they found copper buttons, clay pipes, and silver shoe buckles.



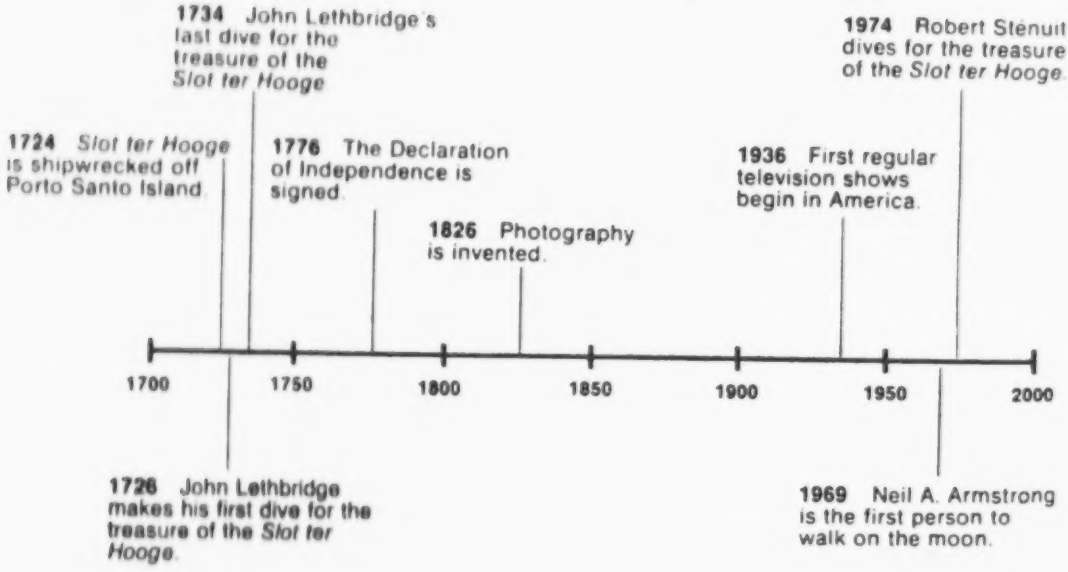
But so far, there were no silver bars. Using an air lift, they dug through the sand. The air lift sucked up sand through a long hose.

Then one day in August, they "struck silver." They found their first silver bar. A few days later they discovered another silver bar. After digging ten feet into the sand, they found 25 more bars.

In early September they came across their biggest find—a chest filled with silver bars. There were more bars beneath the sea, but they would be more difficult to find.

Sténuit decided it was time to leave Porto Santo. Over 200 years ago, John Lethbridge had left behind some of the treasure of the *Slot ter Hooge*. To Sténuit, it seemed right that he should do the same. Perhaps, one day, another diver would find the rest of the treasure.

Below is a time line. It shows important dates in the story of the Dutch ship Slot ter Hooge. *Other important dates have been added to the time line to help you.*


1734 John Lethbridge's last dive for the treasure of the Slot ter Hooge
1974 Robert Sténuit dives for the treasure of the Slot ter Hooge.
1724 Slot ter Hooge is shipwrecked off Porto Santo Island.
1776 The Declaration of Independence is signed.
1936 First regular television shows begin in America.
1826 Photography is invented.
1700
1750
1800
1850
1900
1950
2000
1726 John Lethbridge makes his first dive for the treasure of the Slot ter Hooge.
1969 Neil A. Armstrong is the first person to walk on the moon.

The Dutch ship *Slot ter Hooge*[1] sailed through the English Channel. It was a fall day in 1724. The sky was clear and the water was calm. Many of the passengers and crew lined the ship's deck. They were enjoying the fine weather. But it was not to last.

When the ship reached the North Atlantic Ocean, the weather changed. The sky turned dark and the wind picked up. Soon strong winds and high waves were battering the *Slot ter Hooge*.

The crew fought to keep the ship on course. But the winds were too strong. The waves were too powerful. The ship was pushed in the direction of the Madeira Islands.

Winds slammed the ship against the shore of Porto Santo Island. Rocks tore the ship apart. It began to sink. Passengers and crew fell into the swirling sea. More than 200 passengers and crew drowned. Only 33 lived through the storm.

A year later, in 1725, the Dutch East India Company drew up a contract with John Lethbridge, an Englishman. The company owned the *Slot ter Hooge*. And Lethbridge's job was to recover the ship's treasure for the company. Four chests of coins and 1,500 bars of silver had gone down with the ship.

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TREASURE BENEATH THE SEA
By Dan D'Amelio

Postreading Comprehension Questions Test Written By
Mary Angelino

NAME: _____

DIRECTIONS: After reading the story, color in circle A, B, C, or D for the appropriate answer.

1.) When was the Slot ter Hooge shipwrecked?

(A) 1724
(B) 1725
(C) 1734
(D) 1974

2.) What does "Slot ter Hooge" mean?

(A) Dutch ship
(B) Castle of Hooge
(C) Dutch castle
(D) English channel

3.) What was contained in the ship's treasure?

(A) Three jewelry boxes filled with gold
(B) Four chests of coins and 1500 bars of silver
(C) Five barrels of silverware and rare coins
(D) Four chests of precious gems

4.) What island did the "Slot ter Hooge" crash into?

(A) Madeira Island
(B) Slot ter Hooge Island
(C) Porto Santo Island
(D) North Atlantic Island

5.) Why did the Dutch East India Company pick John Lethbridge to recover the ship's treasure?

(A) Lethbridge was a great swimmer and had the most underwater experience.
(B) Lethbridge was the strongest diver and could carry the heaviest amount of treasure.
(C) Lethbridge had invented a diving machine so he could stay underwater.
(D) Lethbridge was being rewarded for his great ideas.

Used for Experimental Samples A, B, and C

6.) Where did the ship sail through before it was shipwrecked?

(A) The East Indian Ocean
(B) The North Atlantic and the Dutch Sea
(C) The Pacific Ocean
(D) The English Channel and the North Atlantic Ocean

7.) Why did Stenuit and Lethbridge leave behind some of the treasure?

(A) They were not talented divers.
(B) They did not want to overload themselves.
(C) They thought a diver from the future would want to try to recover some of the treasure.
(D) Some of the treasure was locked in the chests.

8.) How did Stenuit recover the treasure?

(A) He dropped a large anchor on a flat rock.
(B) A long hose sucked up sand through an air lift until he found the silver bars.
(C) Copper buttons, clay pipes and silver shoe buckles were floating on the water and attracted his attention.
(D) Silver bars were struck when the anchor dropped on them.

9.) What was the earliest event mentioned in the story?

(A) Stenuit dives for the treasure.
(B) Lethbridge dives for the treasure.
(C) The Slot ter Hooge is shipwrecked.
(D) The Dutch East India Company drew up a contract with Lethbridge.

10.) What was an important difference between Lethbridge's and Stenuit's methods?

(A) Stenuit did not have a team to work with.
(B) Stenuit had advanced air tanks and an air hose.
(C) Stenuit's contract expired after one year.
(D) Stenuit could not stay underwater for more than a few minutes.

11.) In your own words, write a brief restatement of the main idea of the story.

_____

_____

_____

_____

Used for Experimental Samples A, B, and C

Post Test Scores

Experimental Sample A		Experimental Sample B		Experimental Sample C	
1.)	100%	1.)	100%	1.)	100%
2.)	100%	2.)	100%	2.)	100%
3.)	90%	3.)	90%	3.)	90%
4.)	90%	4.)	80%	4.)	90%
5.)	80%	5.)	80%	5.)	90%
6.)	80%	6.)	80%	6.)	80%
7.)	70%	7.)	70%	7.)	80%
8.)	70%	8.)	70%	8.)	70%
9.)	70%	9.)	70%	9.)	70%
10.)	70%	10.)	70%	10.)	70%
11.)	70%	11.)	70%	11.)	70%
12.)	60%	12.)	70%	12.)	70%
13.)	60%	13.)	60%	13.)	70%
14.)	50%	14.)	60%	14.)	60%
15.)	50%	15.)	60%	15.)	60%
16.)	50%	16.)	60%	16.)	60%
17.)	50%	17.)	60%	17.)	60%
18.)	40%	18.)	50%	18.)	60%
19.)	40%	19.)	50%	19.)	60%
20.)	40%	20.)	50%	20.)	60%
21.)	30%	21.)	50%	21.)	40%
22.)	30%	22.)	40%	22.)	40%
23.)	30%	23.)	40%	23.)	30%
24.)	20%	24.)	30%	24.)	30%
25.)	20%	25.)	20%	25.)	10%
Mean	58.40	Mean	63.20	Mean	64.58

Experimental Sample A filled out a prereading questionnaire prior to reading the basal reader passage which included pictorial material.

Experimental Sample B read the basal reader passage which included pictorial material.

Experimental Sample C read the same basal reader passage which deleted pictorial material.

All three samples answered the same post reading test.